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The Desert Locust Situation, 1955/56

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PLAGUES of the desert locust (*Schistocerca gregaria* Forsk.) fluctuate irregularly in their intensity and compass. There occur seasonal contractions or regression periods and longer intervals, recession periods, of a year or more without widespread or intensive swarm activity. In an earlier article [1], summarizing the desert locust situation during 1954 and 1955, it was stated that there were then no indications that the desert locust plague, viewed as a whole, was on the wane. Subsequently certain trends towards the diminuation of the range of the plague have developed and these may be examined in the light of the modern conception of the dynamics of desert locust plagues as recently described.[2]

Northwestern Africa

The previous article on the 1954/55 locust situation noted that swarms resulting from the summer breeding in the African equatorial belt reached northwestern Africa in October 1955. The invasion developed rapidly with immature swarms continuing to invade Spanish Sahara, Morocco, Algeria, Tunisia and Libya in November and December, the infestation becoming particularly severe in Morocco and Algeria. Breeding began in Morocco at the end of January 1956 and in Algeria in February and continued until June. In May breeding occurred in Tunisia. Numerous swarms of the new generation began to form in May when the normal seasonal southerly migration began. By the end of July northwestern Africa was clear.

The extent of the Moroccan infestation and of the control campaign may be gauged from the following figures compiled from the weekly reports issued by the government for the period 26 October 1955 to 27 June 1956:

	Areas Treated (in hectares)
Ground baiting	470,880
Ground dusting and spraying	197,708
Air to ground dusting and spraying	186,849
Total	855,437 ha. or 3,303 sq. miles

In Algeria 7,000 tons of bait, 4,000 tons of BHC dust and 10 tons of concentrated liquid BHC had been expended during the campaign up to 30 May 1956 and the total cost of the campaign was estimated at U.S. $2,857,000. The action taken to destroy invading swarms before oviposition was a notable feature of the campaigns in both Morocco and Algeria. Despite the operations against swarms and their progeny, a strong invasion of the summer equatorial belt by swarms escaping from the northwest developed, reaching Mauretania and French Sudan in May/June and Chad Territory and the Sudan in June/July. Egg laying on a very heavy and extensive scale has been reported and the exceptionally heavy rains that have fallen at least in the Sudan are likely to favor successful breeding.

[1] Lean, O.B. 1955. The desert locust situation 1954/55. FAO Plant Prot. Bull. 4:1–5.

[2] —. 1956. An appraisal of the desert locust problem. FAO Plant Prot. Bull. 4 : 145-147.

Eastern Africa

The situation in eastern Africa which had been critical through most of 1955 cleared by the end of the year. A sequence of intensive anti-hopper campaigns was undertaken especially in the Somali Peninsula (March-June), northern Ethiopia (May-July), southern Ethiopia (September - October and November-December), northern Kenya (September-October), and Somalia (October-December). During these operations about 140,000 hopper bands were destroyed. In some areas egg fields were heavily parasitized, greatly reducing hatching, and it appears that a number of swarms dispersed. As a result of the campaigns and natural factors eastern Africa has been free from swarms since January 1956 though considerable and potentially dangerous scattered populations have been reported, especially from the coastlands of the Somali Peninsula during July and August.

The Arabian Peninsula

In the Arabian Peninsula, the scene of recent large-scale international locust control campaigns, the infestation during the winter-spring of 1955/56 was somewhat less than in 1954/55.

At the end of 1955 two distinct movements of swarms reached the peninsula. Swarms from the west, probably derived from the summer rains breeding in equatorial Africa, penetrated Egypt from Libya in October. The migration continued eastwards reaching Israel, Jordan and northwestern Saudi Arabia in November. During December swarms spread across northern Saudi Arabia as far east as Kuwait. Oviposition began along the northern Arabian Red Sea coast in January 1956.

The second main invasion came to the southern Red Sea coast in November 1955, presumably as a result of swarm displacements through northern Ethiopia and south-eastern Sudan. Breeding began on the coast in December.

The subsequent hopper infestations in both coastal areas were very considerable. In northern Saudi Arabia patchy breeding occurred across the peninsula to the Persian Gulf coast. The evidence available suggests that few swarms of the new generation were formed in the Arabian Peninsula; the first of those reported was seen in March.

North of the Arabian Peninsula extensive breeding occurred in Israel and Jordan as a result of the swarm migration through Egypt already described, but the invasion of Iraq was on a much smaller scale than in 1955 and in Syria the attack was very slight; Lebanon and Turkey were not affected.

Several swarms present in Sinai in June and later in the Egyptian eastern desert were presumably derived from some uncontrolled breeding north of Aqaba. These swarms may have moved south into the Sudan.

The Eastern Region

Since August 1955 the eastern region, comprising Iran, southern U.S.S.R., Afghanistan, Pakistan and India, has remained free from swarm activity though, as in east Africa, considerable scattered locust populations have been reported recently. Some gregarious breeding and local heavy concentrations of fledglings, derived from these populations and requiring control measures, were reported from Rajasthan, India, in August 1956.

Future Prospects

In summary, therefore, the area of desert locust activity, as known in early September 1956, was greatly restricted in relation to the whole invasion region of the species but was near peak intensity in the Sudan and probably also in Chad Territory, with some swarms present also in French Sudan and Mauretania. Elsewhere the only swarms recently reported were a few in the Aden Protectorate in early July. Gregarious breeding was taking place and swarms were present in fewer territories than at any time since 1952. The main threat lay in the summer rainfall area of equatorial Africa, where in the Sudan alone breeding was reported over a gross area of some 300,000 square miles. The plague's developments during the ensuing months will depend largely upon the progress of the control campaigns there. The situation is typical of a seasonal regression with, as yet, no justification for anticipating any prolonged recession period. If breeding

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in the relatively restricted area be controlled thoroughly, a severe check on the plague's development could result. If, on the other hand, swarms escape to migrate into the winter-spring breeding areas of northwestern Africa and the Arabian Peninsula and encounter favorable weather conditions there, a general re-establishment of the plague might ensue. Prospects of an immediate plague decline are also endangered by the known high populations of scattered locusts in the Somali Peninsula, Pakistan and India, as such populations may become concentrated by appropriate weather conditions with subsequent swarm formation.

Whilst generally less dangerous than at the corresponding time in 1955, the situation continues to require the utmost vigilance and the control of gregarious breeding wherever it may occur.

Insect Pests in British Colonial Dependencies: A Half-Yearly Report[1]

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OBSERVATIONS were continued on the rice stem-borer, *Schoenobius incertulas* (Wlk.). Good control can be obtained by applying insecticides just before the emergence of the adults at end of March, end of May, mid-July and mid-October. The insecticides that have been used with good results are one of the parathion type and endrin. It has been noticed that the degree of attack is always more severe in upland and brackish-water paddy than in fresh-water paddy.

Rice is also attacked, as are many other crops, by a number of leaf hoppers, the majority of which belong to the genera *Sogata*, *Thamnotettix*, *Deltocephalus* and *Nephotettix*. The symptoms caused in paddy are chlorotic streaking, dense yellowing and necrosis of the leaves. The insects remain concealed by day and may pass unnoticed until damage becomes obvious, by which time it is often too late to apply control measures.

Application of a spray in the nursery, followed by further applications in the field, has shown some promise. The insecticides used have been a 25 percent DDT emulsion (1 part in 240 parts water) and a 19.5 percent endrin emulsion (1 part in 460 parts water).

Nigeria

It is reported that the lepidopterous stem-borer, *Sesamia botanephaga* Tams & Bowden (*Bull. Ent. Res.* 43: 662-663, 1953.), which is an important pest of maize, and attacks guinea corn, sugar cane and wild grasses in Gold Coast, and also occurs in Nigeria, has been found attacking rice, *Oryza glaberrima* and *O. sativa*, for the first time in Niger Province. It is already known to attack ric elsewhere.

There have been numerous reports fro the Northern Region of the "tree locust", *Ana cridium moestum melanorhodon* (Wlk.), th activity of which appears to have been o an unprecedented scale, but no damage t crops has been reported.

In the field of control, spraying and dust ing trials for the control of the cacao Mirids *Sahlbergella singularis* Hagl. and *Distantiell theobroma* (Dist.), have continued. Success ful control has been obtained with BHC (a lindane) applied either with low-volum power sprayers or high-volume knapsac sprayers.

It is intended that 3,000 acres of Miri infested cacao in different parts of the West ern Region shall be sprayed this season.

In connection with work on the cassav whitefly, *Bemisia* spp., a survey is bein made of all Aleurodidae, with their foo plants, in the Ibadan area. At the sam time a study of the taxonomy of the specie of *Bemisia* in West Africa is being undertaken

Trinidad

Among recently introduced cover an fodder crops at the Central Experiment Sta tion, the legume, *Pueraria phaseloides*, ha been defoliated by the leaf-webbing larva of the Pyralid moth, *Lamprosema indicat* (F.), which is a well-known pest of legumi nous crops in the West Indies.

The introduced grass, *Digitaria decum bens*, was attacked by the Cicadellid, *Koll mollicella* (Fowl.).

It has been shown recently that the rol of the palm weevil, *Rhynchophorus palmaru* (L.), is unimportant in the spread of th nematode, *Aphelenchoides cocophilus* (se

[1] The present report covers the period from January to June 1956.

FAO Plant Prot. Bull. 3 : 178, 1955). The main means of entry of the nematode is through the roots, direct from the soil.

As a precaution against the possible introduction of the Mediterranean fruit fly, *Ceratitis capitata* (Wied.), an amendment has been made in the Plant Quarantine Regulations. No fruit shall be imported into the Colony from the State of Florida, U.S.A. All fruit imported from the rest of the U.S.A. must be accompanied by an appropriate phytosanitary certificate.

Plant Diseases in British Colonial Dependencies: A Half-Yearly Report[1]

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Malaya

CALONECTRIA RIGIDIUSCULA was recorded for the first time in Malaya on durian (*Durio zibethinus*) in 1955 and it has now been found commonly associated with dieback of cacao.

Puccinia polysora occurred on maize, a new record, though the fungus appears to have been present since 1950. The rust has now been found in widely separated localities from Kedah in the North to Singapore in the South.

Corticium solani was recorded on maize for the first time causing a banded rot of the lower leaf sheaths.

Helminthosporium incurvatum was associated with severe leaf spotting of young coconut palms in one area.

Valsa eugeniæ occurred on *Eugenia agnea*, a new host record for Malaya.

Nigeria

Blast of oil palm, of unknown etiology, seriously affected nurseries in the Eastern region but some seedlings recovered from this type of wilt disease.

A species of *Sphacelia* on bulrush mille (*Pennisetum typhoideum*) was controlled b immersing infected grain containing 2.3 pe cent by weight of sclerotia in brine (sp. g 1.1) with a small amount of detergent adde when the sclerotia (sp. gr. 1.07) floated o and were removed. The grain (sp, gr. 1.3 sank and was subsequently washed and drie before planting.

Black pod of cacao (*Phytophthora palm vora*). In the Western region more tha 11,000 farmers were trained in the fungicid control of black pod. The Co-operativ Department, Western Region, imported 8,00 spray pumps, bringing the total numbe imported to 20,000.

Trinidad

Leaf spot disease of bananas (*Mycospha rella musicola* Leach) has been efficientl controlled in Trinidad by means of low-volum oil-based sprays applied with a power mist blowing sprayer. Tip spotting caused b ascospore infection was prominent.

Cacao virus disease has spread to a ne locality where 12 infected trees were foun on one estate only.

[1] This report covers the period from January to June 1956.

Evaluation of Insecticides Against the Brinjal Shoot and Fruit Borer in India

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THE brinjal shoot and fruit borer, *Leucinodes orbonalis* Guen., is the most notorious pest of brinjal or eggplant (*Solanum melongena*) in West Bengal. Owing to its regular and widespread occurrence, the control of this pest is a major problem in the cultivation of brinjal, which is an important vegetable in West Bengal.

There is no evidence of plants in seed beds being attacked and they are usually in-

Figure 1. A shoot of brinjal or eggplant infested by Leucinodes orbonalis.

fested three to four weeks after transplanting. The larvæ bore into the tender axillary shoots which droop down and ultimately wilt (Figure 1). They also bore into the petioles and midribs of large leaves. Such injuries interfere with the normal growth of the plants but they are rarely killed. The plants, however, fail to survive when the main stem is attacked, which is rather unusual. The larvae bore into the fruits when they are set, making them unfit for human consumption. The pest has no regular number of generations and all stages of the insect may be found at any time of the year[1]. Brinjal is cultivated in West Bengal throughout the year and under natural conditions the borer thrives entirely on this plant.

Considerable difficulties have been experienced in the past in combatting this insect. As it is an internal feeder, no curative insecticidal measure could be adopted and preventive measures would have to be relied upon. As already stated, the borer first infests the shoots and later attacks the fruits when they are set. It was therefore decided to aim at protecting the plants during the pre-fruiting stage by routine sprayings of residual insecticides. Studies were undertaken to evaluate a suitable insecticidal treatment and the minimum number of applications necessary to prevent borer infestations in the shoots. In course of the investigation, six field experiments were performed in randomized replicated plots, the details of which will be published elsewhere. Various concentrations of different insecticides namely, BHC wettable at 0.1, 0.2 and 0.3 percent, DDT wettable at 0.05, 0.1, 0.2, 0.3, 0.5 and 1.0 percent, endrin emulsion at 0.04 and 0.08 percent and Tetrax-1, a systemic insecticide, at 0.03, 0.04 and 0.05 percent were tested. Plants were usually given two to three spray applications, the first three to four weeks after transplanting and subsequently at intervals of two to three weeks.

From the data obtained, 0.08 percent endrin spray proved to be the most efficient and economical treatment. Tetrax-1 gave the poorest performance. BHC was the cheapest material used, but it failed to give satisfactory protection to the plants. Higher concentrations of DDT, at 0.5 and 1.0 percent were found to be effective[2] but they were not economical. Thus, taking 60 gallons of spray liquid per acre of brinjal plantation, the cost of insecticide for a single treatment of 0.08 percent endrin is approximately Rs. 4–5–0[3] per acre, while a similar treatment of 0.5 percent DDT would cost about Rs. 17-6-0. Lower concentrations of DDT at 0.2 and 0.3 percent were much less effective than 0.08 percent endrin and are more costly.

The authors therefore recommend two sprayings of 0.08 percent endrin emulsion against brinjal shoot and fruit borer. The first application should be made three weeks after transplanting and the second three weeks later.

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[1] Banerjee, S.N. and A.N. Basu. 1955. On the control of brinjal stem and fruit borer, *Leucinodes orbonalis* Guen. in West Bengal. Sci. & Cul. 20 : 350-351.

[2] Patel, G.A. and A.C. Basu. 1948. Bionomics of *Leucinodes orbonalis* Guen. (Lepidoptera) and *Epilachna* spp. (Coleoptera), the important pests of the brinjal, *Solanum melongena* L. in Bengal. Proc. Zool. Soc. Bengal 1 : 117-129.

[3] One Indian rupee = U.S. $ 0.21 or 1s. 6d.

Dwarf Bunt of Wheat in Italy

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AMONG the diseases of cereals, the one which receives particular attention at the moment in certain countries in continental Europe is the dwarf bunt caused by *Tilletia contraversa* Kühn, the life cycle of which is not yet fully understood. Since the disease was first recognized in North America where it is rather widely distributed, especially in the Northwest, it has been reported in Europe in Germany, Austria, France, Switzerland and Italy but the losses caused have not been particularly serious or at least have not been actually evaluated.

In Italy the occurrence of dwarf bunt was first reported [1, 2] in 1955. Since then additional information has been obtained.

During 1948 when the writer was engaged in the revision of the species of *Tilletia* occurring on cereals in Italy, an examination of more than 200 collections from about 50 provinces revealed the presence in certain collections of chlamydospores similar to those of *T. caries* but having more prominent ornamentation and a gelatinous sheath 1 to 3 microns thick. Such chlamydospores were found principally in mixed varieties from Milan, in variety Cignarellone from Campobasso and in variety Maiorca from Messina. In 1952, similar chlamydospores were again observed in a collection of bunt-infected wheat from Parma. In 1954, dwarf bunt was identified in Piacenza following a report that the bunt-infected wheat plants found there were significantly dwarfed, about one-third shorter than normal plants and had other characteristics of this disease. The infected seed was long-ovoidal or round and coated with a thick reddish-brown tegument. Efforts to induce the germination of the chlamydospores by varying the incubation temperatures were all unsuccessful.

Based upon the characteristics mentioned above, the cause of the disease found in Italy was determined as *Tilletia brevifaciens* Fischer, which was regarded by Conners [3] as a synonym of *T. controversa* which was originally described on *Agropyron repens* in Germany. Conners was of the opinion that wheat probably first contracted dwarf bunt in the mountainous areas of Europe, where native species of *Agropyron* are found naturally infected by *T. contraversa* and that the pathogen was later introduced into North America on wheat or on one of the cultivated species of *Agropyron*.

In Italy, it can be assumed that the dwarf bunt was present long before it was recognized in 1948. Among the records supporting this view, Peglion [4] mentioned that epidemic outbreaks of bunt occurred in 1879, 1919, 1929 and 1946, mostly in the Parma-Piacenza region in the Compartimento of Emilia, which is also the main area where the dwarf bunt was identified recently. Peglion attributed those outbreaks to the use of infected seed and imperfect methods of seed disinfection and he also emphasized the importance of soil contamination as a permanent source of infection. Peglion quoted the observations of C. Samoggia that during some of those outbreaks, such as the one in 1929 at Langherano, Parma, which was stated to be caused by *Tilletia caries*, conspicuous dwarfing of the infected plants occurred. The descriptions of those outbreaks as well as those of the characteristics of chlamydospores lead to the belief that *T. contraversa* rather than *T. caries* was involved.

During the growing season of 1956 a survey was carried out by the writer in collaboration with agricultural workers in

[1] GRASSO, V. 1955. La *Tilletia brevifaciens* G. W. Fischer in Italia. Boll. Sta. Pat. Veg. Ser. 3 (1951). 12: 97-101.

[2] SIBILIA, C. 1955. Italy - The discovery of dwarf bunt. FAO Plant Prot. Bull. 3: 76-77.

[3] CONNERS, I.L. 1954. The organism causing dwarf bunt of wheat. Canadian Jour. Bot. 32: 426-431.

[4] PEGLION, V. 1947. Le Malattie delle piante coltivate cagionate da parasiti vegetali o da agenti inanimati. 8th ed. Casale Monferrato, Milan.

various provinces in order to determine the distribution of the dwarf bunt within the country. The survey did not reveal any foci of infestation other than those mentioned above, and no spontaneous gramineous plants were found to be infected by dwarf bunt. An unexpected finding during the survey was the discovery of an unusual outbreak of *Tilletia foetida* on wheat variety Frassineto at Orvieto in Terni province, probably due to careless treatment of the seed.

The observations so far appear to indicate that the dwarf bunt of wheat is of limited distribution in Italy and is not a disease to cause great concern.

Plant Disease Situation in the United States[1]

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Soybean Cyst Nematode in North Carolina

THE soybean cyst nematode, *Heterodera glycines* Ichinohe, was tentatively identified as the primary cause of death of soybean plants in a field three miles south of Burgaw, North Carolina, 31 July 1956, by F.I. Bowen and C.D. Bowers. The owner of the property on which the nematode was found reported the previous day that he believed this nematode was "burning up" his crop, and requested a confirmation of his diagnosis.

This infested property is 19 miles north of extensive infestations at Wrightsboro, North Carolina. Another center of infestations is located at Castle Hayne, North Carolina, approximately five miles north of Wrightsboro. Between these three centers of infestations there are approximately 484 properties which are regarded as not infested with the nematode, because nearly 10,000 composite soil samples comprising 560,000 subsamples have been collected on an 8 × 8 meter grid pattern, on 6,867 acres on these farms during the past year without a soybean cyst nematode being found in them. The infested areas comprise 79 properties and 1,687 acres. All of the infested properties at Wrightsboro belong to one family. A State quarantine is in effect in the Castle Hayne area.

The above information was communicated by Joseph F. Spears, F.I. Bowen and C.D. Bowers, of the Plant Pest Control Branch, Agricultural Research Service, United States Department of Agriculture.

[1] This report is based upon material submitted by Collaborators of the Plant Disease Epidemics and Identification Section, Agricultural Research Service United States Department of Agriculture.

Alfalfa Diseases in Southern California

Donald C. Erwin, of the University of California Citrus Experiment Station, Riverside, California, reports the results of surveys carried out since 1953 on diseases of alfalfa which is one of the most valuable crops grown in southern California, under the unique conditions in the irrigated desert valleys. The surveys revealed the presence of certain diseases not previously reported from some sections of the area, such as anthracnose, *Phytophthora* root rot, and bacterial wilt, and a minor occurrence in the Imperial Valley of crown rot caused by *Stagonospora meliloti* (Lasch) Petr. In addition, dwarf, *Rhizoctonia* root canker, and scald, which is a disease associated with excessive irrigation during periods of high temperature, were also present. *Rhizoctonia* root canker and scald recur year after year and are the most serious factors involved in stand depletion. Bacterial wilt, *Phytophthora* root rot, and anthracnose must be considered of great potential importance should they become more prevalent.

Anthracnose. Anthracnose, due to *Colletotrichum trifolii*, was found in Orange County in 1953, in Santa Barbara County in 1954 and in Imperial County in 1955. In addition to the black irregular spots on the lower parts of stems, the disease also caused crown rot. The crown rot appears to be more important than the stem injury, although in some fields much stem breakage was noted as a result of disease attack on the stems.

Pathogenicity of the causal fungus was demonstrated by inoculating plants and seedlings about two months old of the Africa

variety with mycelial suspension. Since lima beans are an important crop in rotation with alfalfa in both Orange and Santa Barbara Counties, seeds of Fordhook Concentrated variety were also planted in soil infested with *Colletotrichum trifolii* from alfalfa to determine its susceptibility. No reduction in percentage of seedling emergence, however, was observed and bean plants growing in such infested soil showed no symptoms of disease.

Optimum temperature range for growth of the Orange and Santa Barbara County isolates of the fungus on potato-dextrose agar plates was 24-27° C., the growth being slow at 8° and 33° C. These data are similar to those reported for *Colletotrichum trifolii*.

This is apparently the first report of anthracnose on alfalfa in California. The disease is not yet a serious problem since it does not seem to be widely distributed.

Phytophthora root rot. The occurrence of this disease caused by *Phytophthora cryptogea* was first reported in 1953. Since 1953 the disease has been seen frequently in the San Joaquin, Sacramento, and Antelope Valleys but it was first noted in the Imperial Valley only in early 1955, on a farm that had been reclaimed from the desert only one year before. In most fields affected by the root rot, soils are heavy, with a high moisture-holding capacity. In this field, however, the soil contained a high percentage of sand and it was necessary to irrigate every seven to ten days, which apparently provided optimum conditions for infection. Increasing the dry interval between irrigations seemed to arrest the disease slightly but did not control it. The stand was eventually so depleted that it could not be economically maintained. The disease has since been found in several other fields in the Imperial Valley on clay soils.

Host-range tests so far indicated that the fungus is severely pathogenic only to alfalfa. More extensive tests to include more crops are being conducted.

Bacterial wilt. Bacterial wilt, caused by *Corynebacterium insidiosum*, is becoming more prevalent south of the Tehachapi Mountains. The organism has been isolated from diseased plants from fields in Riverside, Orange, Los Angeles, San Bernardino, Ventura, Santa Barbara and Imperial Counties. In Imperial County the disease was first found in 1954. It has not been identified in the Coachella or Palo Verde Valleys.

Soil temperatures are commonly extremely high during summer in the Coachella, Palo Verde, and Imperial Valleys. In the Imperial Valley in 1951 temperatures at 3 ½ inch depth reached an average maximum of 100° F. in July in soil with no vegetation. Winter and spring soil temperatures were moderate, and maxima ranged from 58° to 73° at the same depth from February to April. In 1955 summer soil temperatures as high as 108° to 110° F. at 2-inch depth were noted.

Cardinal temperatures for the growth of *Corynebacterium insidiosum* in culture have been reported as 1°, 21-24°, and 31° C. (approximately 34°, 70-75°, and 88° F.). These data indicate that winter soil temperatures in the Imperial Valley should be ideal for the development of the pathogene. Since alfalfa roots grow deep into the soil, the organism could probably survive during the summer in roots at 1 to 2 feet depths, where soil temperatures do not reach such extremes.

The delayed appearance of bacterial wilt in the Imperial Valley may be partly explained by the fact that alfalfa hay has seldom been transported into this region from infested areas, the commercial movement of hay being mainly toward the Los Angeles feeding and dairy enterprises. Since the bacterial wilt organism may be disseminated in affected forage, on implements, or in irrigation water, incidence of the disease may be expected to increase in southern California.

The resistant variety Caliverde is well adapted to most of the southern California area except the Imperial, Coachella, and Palo Verde Valleys, where it fails to produce as much forage in the winter as the adapted varieties Africa or India.

Dwarf disease. The incidence of dwarf disease of virus origin may be decreasing in southern California. In 1953 dwarf was found in only five fields, whereas bacterial wilt was found in 23. The reason for the decreased incidence of dwarf is not definitely known but it may be associated with decreased insect vector populations. By using the variety California Common 49, which is tolerant to the virus, the life of a profitable

stand can be extended at least one to two years. Dwarf has not been seen in the Imperial, Coachella, or Palo Verde Valleys.

Rhizoctonia root canker. This disease, caused by *Rhizoctonia solani*, is responsible for great losses to growers in the Imperial and Palo Verde Valleys. It is favored by high soil temperatures and is most prevalent during the period from July to October.

Approximately 100 isolates of *Rhizoctonia* from alfalfa, flax, and cotton were tested on alfalfa, but only three caused root canker. Many isolates were pathogenic to seedlings but not to plants one to two months old. Since no control is known, this is probably the most serious disease of known cause in the irrigated desert valleys.

Scald. The scald disease is nearly equal to *Rhizoctonia* root canker in economic importance. During periods when soil temperatures are at their highest in the hot irrigated desert valleys, a nearly complete loss of stand of alfalfa may follow heavy irrigation. Foliage of affected plants commonly turns yellow, and a tan discoloration of the xylem tissue of the root occurs. In four to ten days most of the plants in the affected area wilt and die. Preliminary experimental results show that alfalfa plants growing in potted Imperial Valley soil were damaged when soil temperature was held at 100° F. for 24 hours, but only when soil was saturated. In well-drained soil alfalfa plants withstood soil temperatures up to 113° F. without showing visible damage. Thus, the high temperature alone is not responsible for plant death.

Scald has been controlled by some growers by carefully preparing the land for irrigation prior to planting and by preventing an excess of water to stand on alfalfa after irrigation. Many growers stop irrigation and harvesting completely from late July to September, both to avoid scald and to prevent certain grasses that grow luxuriantly at high temperatures. This practice prevents scald but results in severe desiccation of alfalfa taproots and the death of many plants.

In the Imperial and Palo Verde Valleys many alfalfa fields are affected each summer by either scald or *Rhizoctonia* root canker, with stand reduction ranging from 10 to 100 percent.

Renovation of fields with a disc, springtooth harrow, or sub-soiling equipment, followed by replanting of alfalfa seed at a rate of 20 to 30 pounds per acre during September or October, is a common practice in this area. The new stand is established quickly, and a full stand is obtained during the winter. This growth is usually pastured by sheep, and approximately seven to nine hay crops are harvested the following spring and summer. This is probably one of the few areas in the United States where replanting alfalfa in an old stand is profitable. This practice makes alfalfa-growing economically practicable despite the serious damage done by *Rhizoctonia* and scald during the period from July to October.

Outbreaks and New Records

Jamaica

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A New Disease of Coconut

A LARGE number of five-year-old coconut palms growing in rich alluvium soil were seen exhibiting a pronounced dieback of roots at the base of the stems. This dieback occurs in the outer tissue of the stem at or near ground level before the roots enter the soil, resulting in a tremendous reduction of roots. Most of the plants that were already commencing to bear did not have enough roots to support them and could be easily pushed over. Two plants dug up had active roots only in an area about nine inches immediately below the base of the stems and no roots at ground level.

Examination of affected palms showed the presence of dark brown discolored tissues in the section of the bark in which the roots were dying. Most of the roots had five or six separate growing tips all burnt off, giving a bunchy appearance at the ends. The discoloration at the individual root tips did not progress along the roots but was sealed off. Cultures made of the roots and sections of the bark yielded several fungi. Further investigation is proposed on this aspect of the problem to see if any fungus is consistently associated with the condition.

A large number of ants along with mealy bugs were seen around some of the plants but did not appear to be contributory to the condition.

This new disease is in no way connected with the unknown disease or lethal yellows and frond drop, both of which are suspected to be caused by insect-transmitted viruses. Although it should be regarded as serious, it has up to now been localized in its occurrence and there is no reason for undue alarm. (The above information was received through the Caribbean Commission, Trinidad).

Southern Rhodesia

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Causeway, Salisbury

Khapra Beetle

During the first half of 1956 there was no diminuation in the attacks of khapra beetle (*Trogoderma granarium* Everts), which was first found in Southern Rhodesia in February in stored beans. The original outbreak at Bulawayo was reduced by methyl bromide fumigation but it has upsurged there again and the infestation seen in June was the heaviest so far found.

Green Vegetable Bug

The green vegetable bug (*Nezara viridula* L.), which has a very wide host range, was exceptionally abundant in tobacco early in 1956. It has not previously been noticed as a serious pest of this crop in Southern Rhodesia, but this year caused extensive damage. Leaves and young shoots wilted very quickly after being pierced and did not subsequently recover.

African Army Worm

The African army worm (*Laphygma exempta* Wlk.) continued to be widespread through January and early February in 1956. Its occurrence differed from the outbreak of early 1954, since there were no clear-cut broods, and larvæ in various stages of development were often found together.

United States

Plant Quarantine Branch
Agricultural Research Service
United States Department of Agriculture

Discovery of Melon Fly

One adult female melon fly (*Dacus cucurbitæ* Coq.) was trapped on the campus of the University of California at Los Angeles on 24 July 1956. Intensive scouting and trapping programs are now under way.

The melon fly is known to be widespread in Asia and occurs also in certain Pacific islands, northern Australia, East Africa and Mauritius. In addition to cucurbits which are the main hosts, it was reported to attack solanoceous and leguminous plants, and tropical fruits such as papaya, mango, guava, citrus, carambola (*Averrhoa carambola*), custard apples (*Annona* spp.), and granadilla (*Passiflora* spp.). In Formosa, it has as many as eight generations each year.

This appears to be the first record of this fly in America.

DIGEST OF PLANT QUARANTINE REGULATIONS

SECOND SUPPLEMENT

The *Second Supplement* was prepared by L. J. Dumbleton, formerly Plant and Animal Quarantine Officer of the South Pacific Commission, for the purpose of implementing the recommendations of the South Pacific Commission Conference on Plant and Animal Quarantine which was held at Suva, Fiji, in 1951. It was made available for inclusion in this series through the courtesy of the South Pacific Commission which has been co-operating closely with FAO in the efforts of facilitating the exchange of information on plant quarantine legislation.

The present Supplement, which is published in both English and French, contains summaries of the plant quarantine legislation of fourteen territories in the South Pacific Commission area, namely:

American Samoa	New Hebrides
British Solomon Islands	Niue Island
Fiji	Norfolk Island
Gilbert and Ellice Islands	Tonga
Nauru	Union (Tokelau) Islands
Netherlands New Guinea	U.S. Trust Territory of the Pacific Islands
New Caledonia	Western Samoa

The Digest and supplements are complementary to the plant quarantine announcements published in the *FAO Plant Protection Bulletin*, with which they should be read. Further supplements will be issued from time to time to cover additional countries and territories.

Plant Quarantine Announcements

Federal Republic of Germany

1. Order to prevent the introduction of fall webworm of 31 July 1956 came into force 22 August 1956 and is applicable also to Western Berlin.

Importation of plants and parts of plants infested or suspected of being infested by the fall webworm (*Hyphantria cunea*) is prohibited.

Fresh plants belonging to Angiospermæ and their aerial parts imported from Albania, Austria, Bulgaria, Canada, Czechoslovakia, Greece, Hungary, Japan, Poland, Rumania, the United States, the USSR and Yugoslavia must be accompanied by an official phytosanitary certificate of the country of origin, stating that such plants have been inspected and found free from infestation. The certificate, which will not be required before 1 October 1956, must be in German and in the language of the country of origin, issued within ten days before the shipment of the plants. The certificate requirement is not applicable to the following plant materials:

(*a*) seeds;
(*b*) pineapples and bananas;
(*c*) fruit and vegetables accompanying travellers;
(*d*) small consignments less than 5 kilograms for consumption; and
(*e*) bunches of plants and wreaths carried by travellers for non-commercial purposes.

All plants and parts of plants requiring phytosanitary certificates as well as small consignments, together with their packings and carriers, will be inspected at the point of entry. Inspection, however, is not required for tomatoes or monocotyledonous plants and parts thereof during the period from 1 November to 15 April. Plants and parts of plants not requiring certificates are not liable to inspection unless there is indication of infestation.

Certification and inspection requirements will not apply to consignments in direct transit under customs supervision.

Fresh vegetables requiring phytosanitary certificates and small consignments of fresh vegetables may be imported only through the points of entry approved for the entry of potatoes.

2. Proclamation of 27 July 1956 issued by the Federal Ministry of Food, Agriculture and Forestry establishes measures regulating the importation of Christmas trees from Denmark.

By virtue of Order of 3 June 1930 relating to the prevention of introduction of diseases of conifers it authorizes the importation from Denmark during October, November and December 1956 of the following Christmas trees without roots: fir (*Abies*), pine (*Pinus*), Douglas fir (*Pseudotsuga*) and hemlock (*Tsuga*). This authorization may be withdrawn, if such imports are found to be frequently infected.

Guatemala

Resolution of the Ministry of Agriculture of 29 June 1956, published in the *El Guatemalteco*, Vol. 147, No. 87, 20 July 1956, adds the State of Florida of the United States onto the list of countries given in the Resolution of 9 April 1956 (see *FAO Plant Prot. Bull.* 4: 173. 1956.), from which the importation into Guatemala of unmanufactured or unprocessed plant products is prohibited. Other countries and areas on the list are Costa Rica, South America, Asia Minor, the Mediterranean area, Canary Islands, Bermuda, Madeira Islands, Azores Islands, Mauritius, Madagascar, New Zealand, Hawaii, Australia, Nigeria and Congo.

This new Resolution was made because of the recent discovery of the Mediterranean fruit fly in Florida.

Italy

Ministerial Decree of 8 June 1956, published in the *Gazzetta Ufficiale*, Vol. 97, No. 194, 4 August 1956, prohibits the exportation of citrus plants and green parts thereof of all species produced in the coastal zone of the Province of Palermo to foreign countries and other provinces in Italy. The exportation of citrus fruit of all species from that zone is also prohibited unless each consignment is accompanied by an official certificate, indicating that the consignment is free from *Mytilococcus gloverii* or has been disinfested with hydrogen cyanide. This Decree repeals the Decree of 10 May 1949.

Union of South Africa

1. Proclamation No. 91 of 8 May 1956, published in the *Government Gazette*, Vol. 184, No. 5683, 25 May 1956, declares the following to

be included in the definition of "plant" for the purpose of the Agricultural Pests Act of 1911, as amended:

(*a*) all parts, dead or living, and the seeds and products of the okra plant (*Hibiscus esculentus*), including edible and dry pods thereof;
(*b*) all parts, dead or living, and the seeds and products of the kenaf plant (*Hibiscus cannabinus*), including the pods thereof, but excluding kenaf fiber which has been rotted or decorticated.

The importation of such plant materials, except those from the Protectorates of Bechuanaland, Swaziland and Basutoland, is prohibited by Proclamation No. 93 of 7 May 1956 (see *FAO Plant Prot. Bull.* 4:190. 1956).

Government Notice No. 940 of 25 May 1956 deals with the same subject.

2. Proclamation No. 92 of 7 May 1956, published in the *Government Gazette* 25 May 1956, repeals paragraph (*b*) (iii) of Proclamation No. 201 of 13 September 1937, which specified that the introduction of unmanufactured leaf tobacco, cotton seed, unmanufactured cotton lint, and all kinds of unspun cotton waste from the Belgian Congo, Nyasaland, Northern Rhodesia or Southern Rhodesia, was to require written permit of the Department of Agriculture, in addition to other general requirements concerning inspection and treatment. The requirements now in force for importation of unmanufactured cotton and cotton waste are given in Proclamation No. 93 of 1956.

United States

Revised administrative instructions prescribing method of treatment of mangoes from the West Indies, issued 22 May 1956 and published as Foreign Quarantine Notice 319.56-2i in the *Federal Register* Vol. 21, No. 102, 25 May 1956, supersede the instructions issued 2 March 1954 (see *FAO Plant Prot. Bull.* 2 : 174. 1954). The revised instructions authorize an alternate procedure for the fumigation of mangoes grown in Cuba and their entry into the United States when they have been certified by a representative of the Plant Quarantine Branch of the U. S. Department of Agriculture as having been fumigated and safeguarded at point of origin under his supervision. Final release of the fruit for entry is conditioned upon compliance with specified safeguards.

Shipments of mangoes produced in Cuba that are not certified under the alternate procedure and mangoes from other places in the West Indies are subject to the same requirements as specified in the 1954 instructions, including fumigation with ethylene dibromide upon arrival in the United States.

News and Notes

Nicaragua Adheres to International Plant Protection Convention

The Government of Nicaragua became party to the International Plant Protection Convention on 2 August 1956, when its instrument of adherence was received by the Acting Director-General of FAO. The number of governments contracting to the Convention, including both signatory and adhering members, is thus, at the time of writing, 35, namely: Argentina, Australia, Austria, Belgium, Cambodia, Canada, Ceylon, Chile, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Greece, Guatemala, India, Iraq, Ireland, Italy, Japan, Korea, Laos, Luxembourg, the Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Republic of the Philippines, Portugal, Spain, Sweden, the Union of Soviet Socialist Republics, the United Kingdom, and Yugoslavia.

Inter-American Cacao Conference

The Sixth Conference of the Inter-American Technical Cacao Committee, organized by the Instituto de Cacau da Bahia in co-operation with the Inter-American Institute of Agricultural Sciences and other institutions, was held in the city of Salvador, 20-27 May 1956. In addition to American countries, the Gold Coast, São Tomé, Portugal, Germany, Indonesia, and the United Kingdom were represented.

The technical papers presented at the section of pathology and entomology mostly dealt with chemical control of the destructive diseases and pests, such as *Phytophthora* and *Monilia* pod rots, *Pellicularia* thread blight, and the leaf-cut ant *Atta cephalotes*. Virus, witches' broom, *Ceratostomella*, *Monilia*, *Phytophthora*, anthracnose and "buba" or cushion gall were named as the seven most important diseases of cacao from the viewpoint of the whole world. Among insect pests of cacao, *Distantiella theobroma*, *Sahlbergella singularis*, *Helopeltis bergrothi*, *H. antonii*, *H. theivora* and the principal vector of swollen shoot virus, *Pseudococcus njalensis*, were mentioned as the most important in the Old World, and *Selenothrips rubrocinctus*, *Monalonion* spp. and the mealy bugs associated with the virus disease in Trinidad as the most important in the New World. The ant *Azteca paraensis* is a major pest in the State of Bahia of Brazil, but does not occur anywhere else.

The Conference made a number of recommendations aiming at the improvement of cacao culture. The recommendations concerning cacao quarantine for the purpose of preventing further spread of dangerous diseases are similar to those of the Fifth Conference (see *FAO Plant Prot. Bull.* 3 : 31. 1954.). With regard to plant introduction, the Conference recommended that the cacao-producing countries co-operate with the U.S. Department of Agriculture in the world cacao collection which is now being maintained at Coconut Grove, Florida, and make use of the facilities available there to safeguard the exchange of propagating materials. As concerns disease and pest control, the Conference recommended the investigation of the possibility of using oil-based or water-based concentrated chemicals in low-gallonage applications, the standardization of experimental design and recording of results, the correlation of climatological and environmental data with disease incidence, and a search for varieties resistant to *Ceratostomella*.

OIRSA Activities

The *Organismo Internacional Regional de Sanidad Agropecuaria* (OIRSA), which covers Central America, Panama and Mexico, was established by the governments of the region in July 1955 as a regional agency to deal with problems in both plant and animal protection fields. On the plant protection side, its main activities are related to plant quarantine, and the control of the migratory locust and the Mediterranean fruit fly.

In order to provide trained personnel for the enforcement of plant quarantine legislation, a preparatory short course in plant quarantine was held at Turrialba, Costa Rica, from 23 July to 31 August 1956, in co-operation with the U. S. International Co-operation Administration, the U. S. Department of Agriculture, the Inter-American Institute of Agricultural Sciences and FAO. Ten students from six countries attended the course and were given basic training in plant pathology, entomology, economic botany and general principles of plant quarantine. As arranged with the United States Government, those students will participate later at the regular training course in plant quarantine and plant protection organized by the U. S. Department of Agriculture in New York, for further training.

In view of the interest of the governments in adopting uniform plant protection procedures, a draft basic law on plant protection has been prepared and has been submitted to the governments for use as a guidance in the formulation of new legislation and in the modification of existing legislation in this field. In this connection, a list of destructive plant diseases and pests which are not established in the region but require special attention in quarantine enforcement is under preparation.

Through the intensive efforts of the former International Committee for Locust Control (CICLA), large-scale locust outbreaks in Central America have been prevented by the effective control of incipient swarms in the outbreak areas. The only current plague which commenced in 1951/52 is confined to northern Honduras. The combatting units organized by OIRSA and the anti-locust service of Honduras are now active in that area to keep the outbreak under control. The investigations initiated by CICLA, especially in connection with the determination of foci within outbreak areas and the ecological factors affecting locust development, are being continued.

The control of the newly introduced Mediterranean fruit fly in Costa Rica is another problem of regional importance for which OIRSA has provided assistance. Trapping operations are being systematically carried out in the infested areas and an intensive control campaign will be initiated when the dry season begins. Owing to the favorable ecological conditions, it may be difficult to achieve the complete eradication of the fly. But efforts are being made to prevent its further spread within Costa Rica and into neighboring countries.

In addition, OIRSA is engaged in the compilation of records with regard to plant diseases and insect pests which are known to occur in the region, and diseases and pests of coffee, cacao and coconut which occur within and outside the region.

Roma - Tip. del Senato del dott. Giovanni Bardi